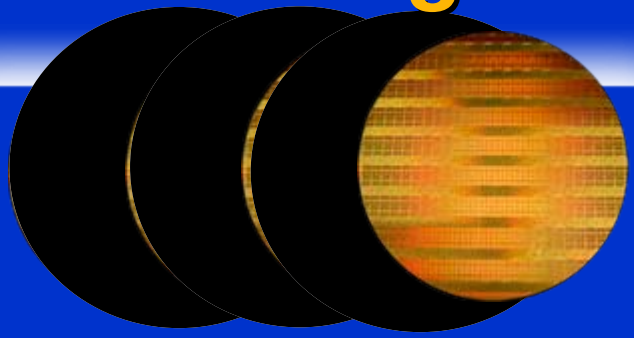
Intel Technology and Platforms

Stephen L. Smith
Vice President & Director
Desktop Platform Operations

Digital Enterprise Group
Intel Corporation

June 2006

The Winning Formula



65nm Process

New Microarchitecture

Ramping Dual Core Everywhere

+

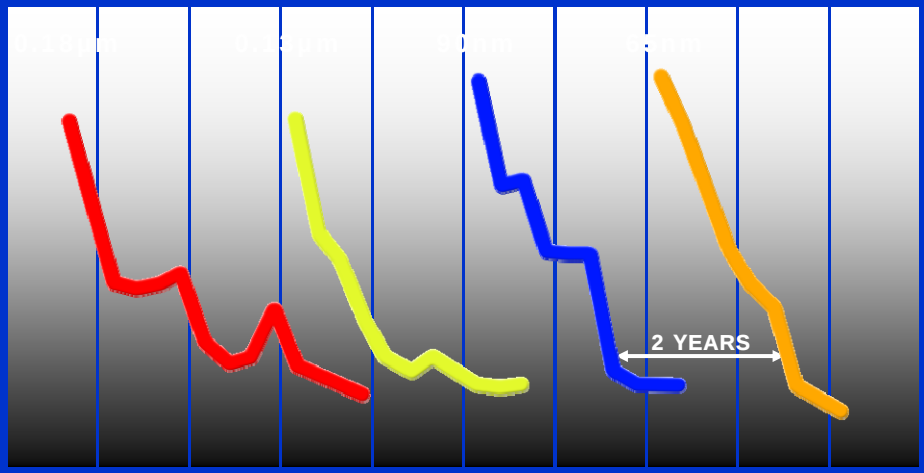
Best Roadmap in Years

Platforms

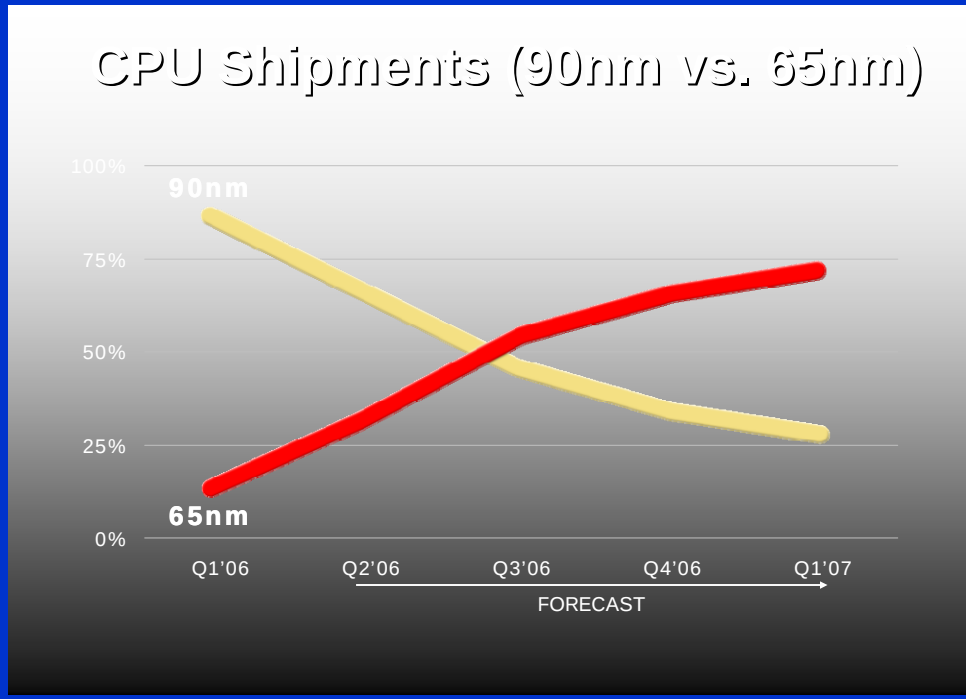
Leadership Platforms in Each Segment

intel

Intel's Technology & Manufacturing Pipeline



Wafer Defect Density



Source: Intel

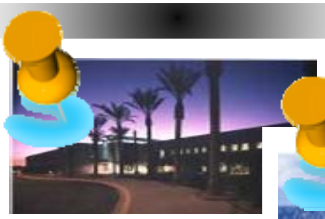
300mm Fab Manufacturing

Oregon D1D

Oregon D1C D1C

Ireland
FAB24 FAB24E

Key: 90nm 65nm



Arizona
Fab 12C 12C

New Mexico Fab 11X

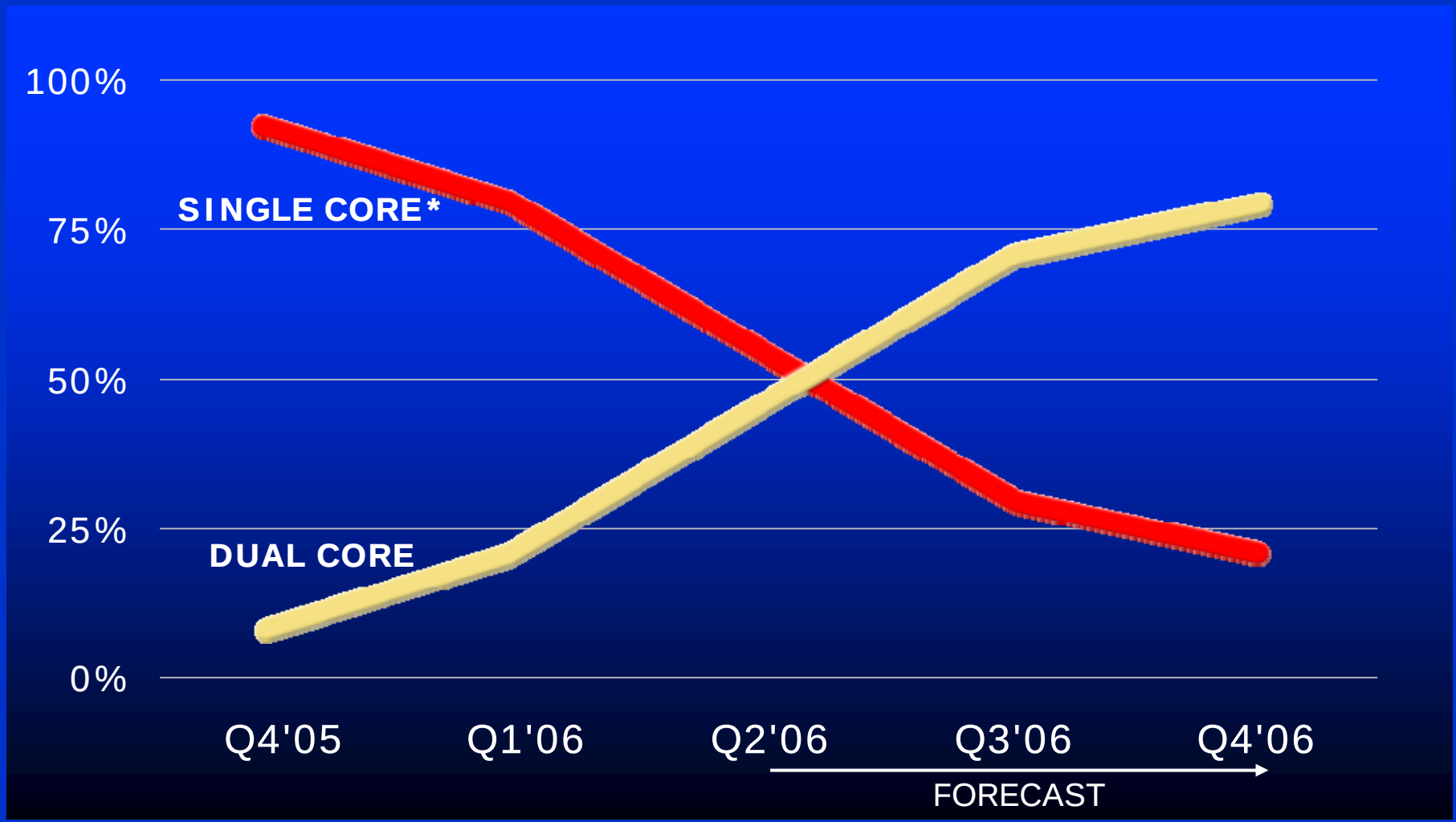
300mm Factories

- Four 300mm factories online today
- Fab 12 (Arizona) reopened 65nm Nov'05
- Fab 24 (Ireland) expansion in early 2006
- Fab 32 (Arizona) in 2007

The Scale to Deliver Platforms

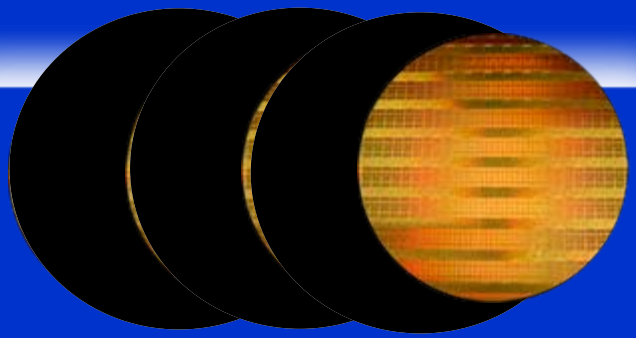
Source: Intel

Rapid Dual Core Ramp



Source: Intel, *Mobile and Desktop Performance Segment

The Winning Formula



65nm Process

+

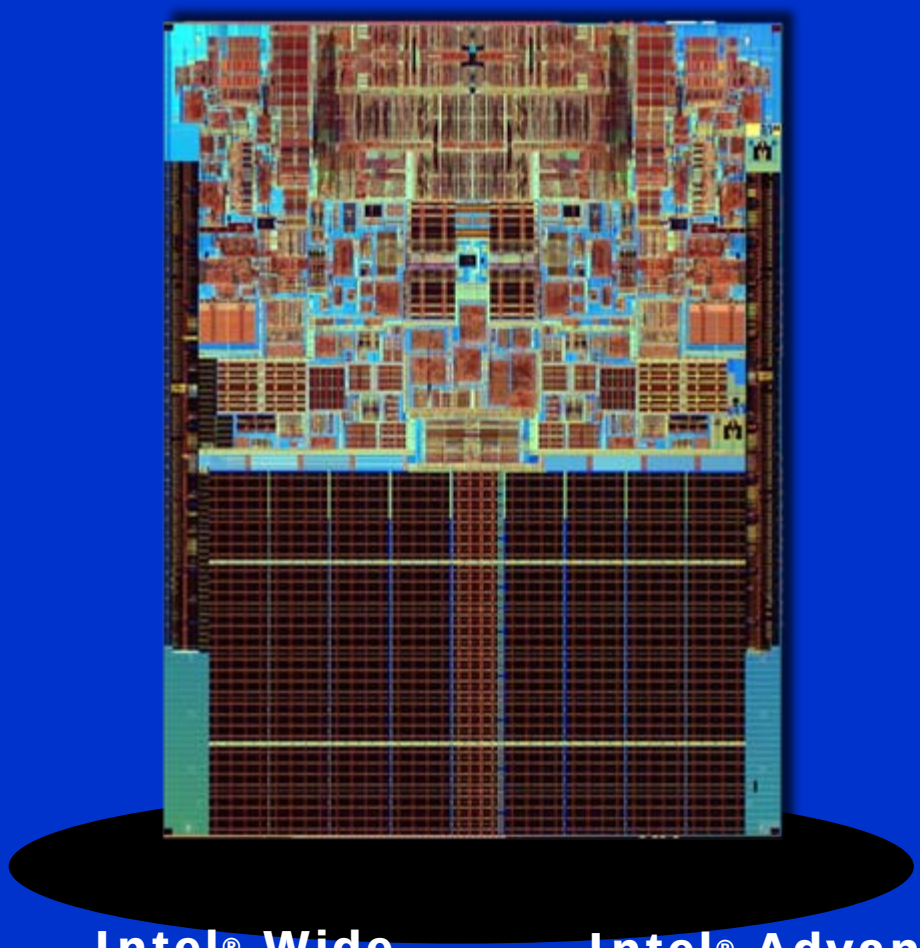
New Microarchitecture

Platforms

intel

Intel® Core™ Microarchitecture

Shipping Soon (2006)

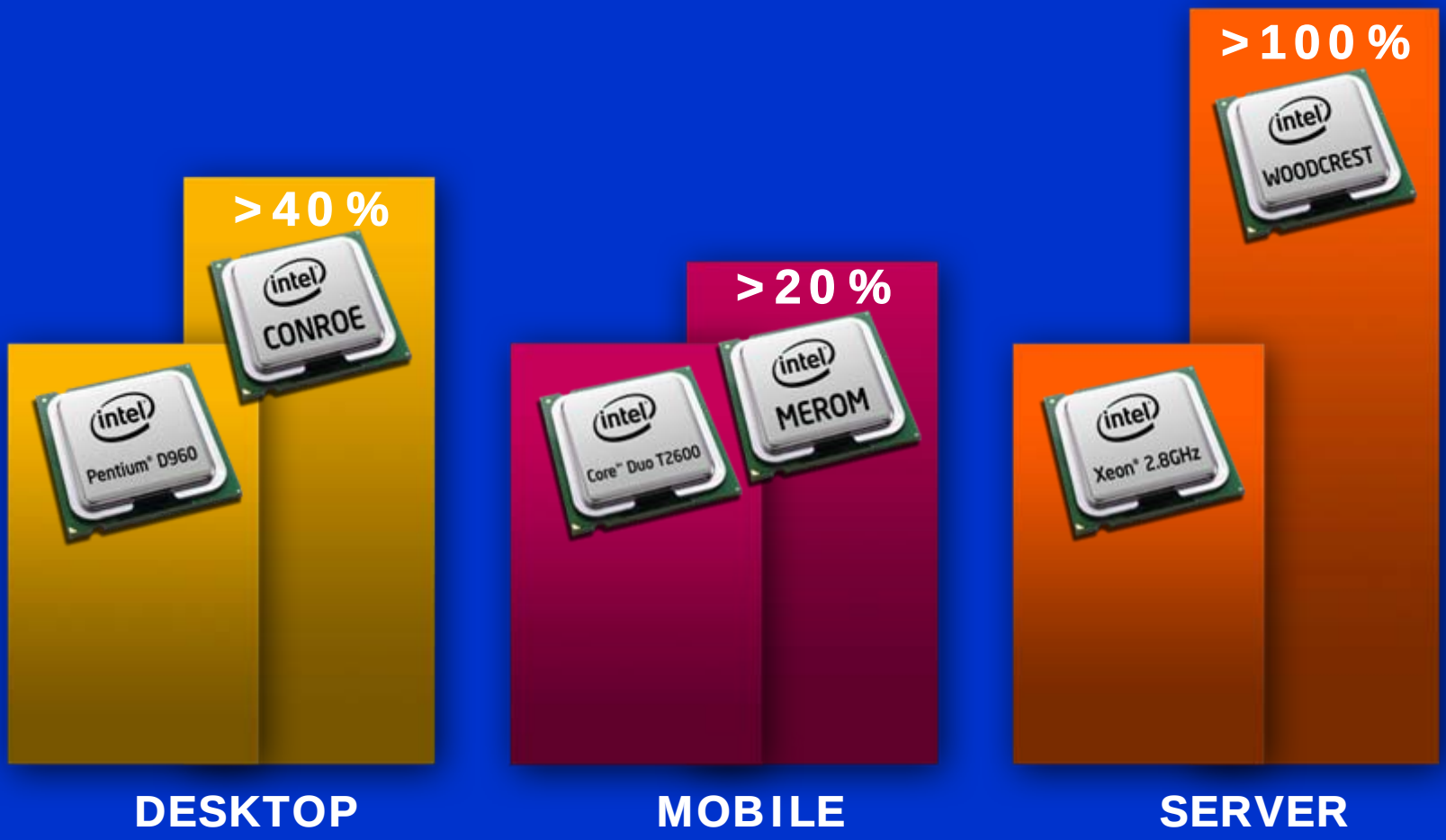


Intel® Wide Dynamic Execution

Intel® Advanced Media Boost

Intel® Advanced Smart Cache

SPEC-rate Performance

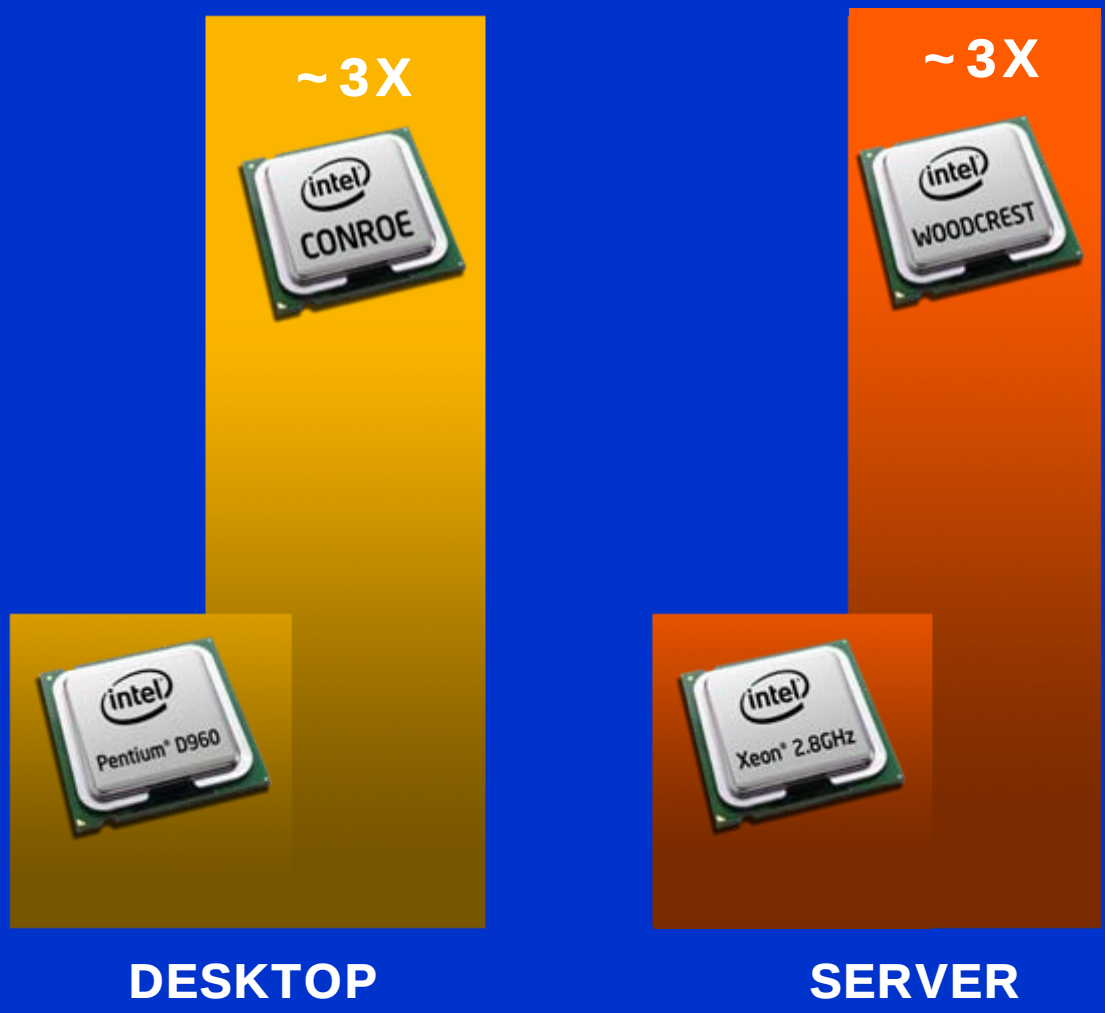


Source: Intel based on estimated SPECint_rate_base2000

Performance per Watt

Source: Intel based on estimated SPECint_rate_base2000 and thermal design power

Performance per Watt



Source: Intel based on estimated SPECint_rate_base2000

Technology Leadership
"Conroe" in the Press

"…Intel is poised to change the face of the desktop computing landscape."
HotHardware.com
March 9 2006

"…we have to say that Intel have a major performance lead.."
Hexus.net
March 9 2006

"Intel Regains the Performance Crown."
Anandtech.com
March 8 2006

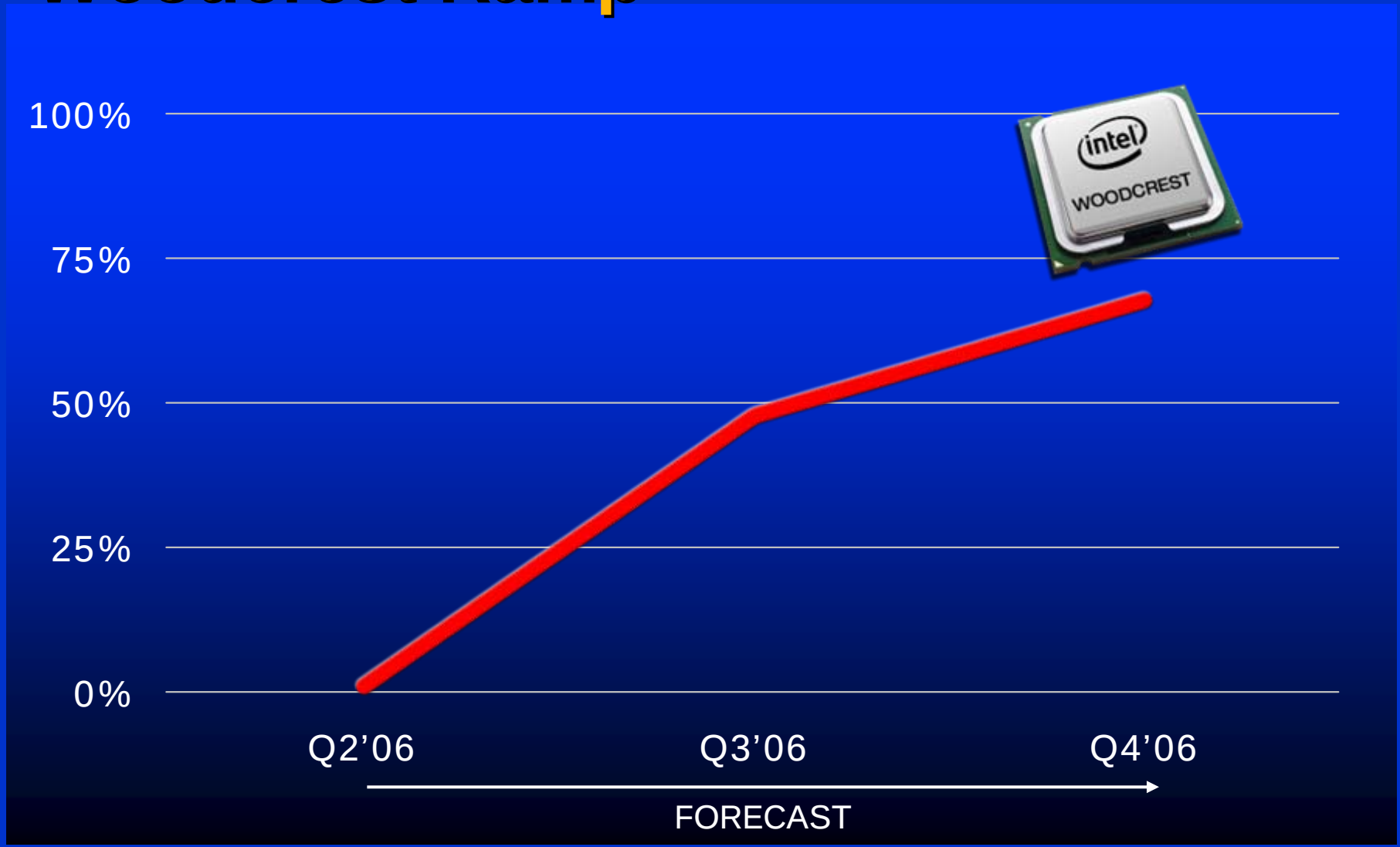
". . . Intel Dishes the Knockout Punch to AMD with Conroe"
GDHardware.com
March 9 2006

Intel® Core™ 2 Extreme Processor

- Intel® Core™2 Extreme Processor
- 2.93GHz/1066 at launch
- 3.2GHz this year
- Quad Core (code name is Kentsfield, brand TBD) Q1'07
- 975X and P965 chipsets
- Extremely high performance for both games and content creation

- Intel® Core™2 Duo Processor
- 2.66GHz/1066 and below at launch
- P965 and G965 chipsets
- Targeting both performance and mainstream segments

Woodcrest Ramp

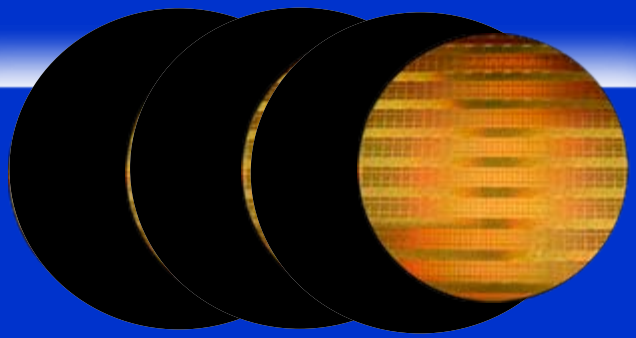


Source: Intel, % of Total Xeon® DP Shipments

Desktop and Mobile Multi Core Ramp

	2006* Previous Forecast	2006* UPDATE
DESKTOP*	>70% Dual Core	75% Dual Core
MOBILE*	>70% Dual Core	90% Dual Core

The Winning Formula



65nm Process

+

New Microarchitecture

Platforms

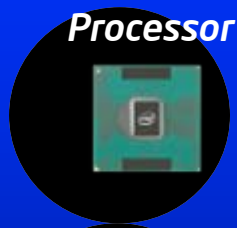
intel

The Platform Strategy Works

	2004	2005 PLAN	2005 ACTUAL
VOLUME	16Mu	21Mu	32Mu

Source: Intel

Centrino® Duo 2006 (Napa):
"No Compromises" Dual Core Transition



		Platform Bottom Line (vs. 2005)
Intel Core Duo inside	*World's First Low Power, Mobile Dual Core Microprocessor*	**70% More Performance**
Mobile Intel 945 Express Chipset Family	*Lowest Active Power Integrated Graphics*	**28% Less Power Usage**
Intel PRO/ Wireless 3945ABG Network Connection	*Lower Component Count* *Better Performance in Noisy Environment* *Less Power for Idle Association*	**30% Smaller Footprint** **260 Design Wins**

Source: Intel. See back-up for system configurations and other important legal information

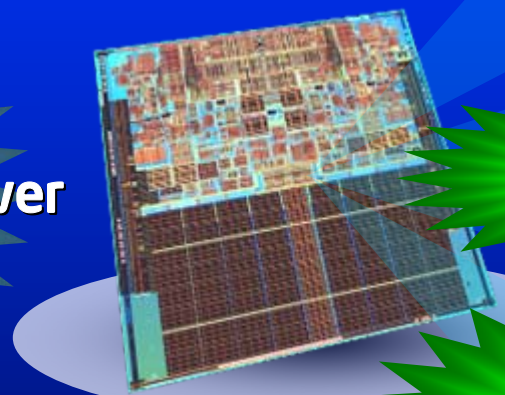
Lead Extends with Merom

"Drop In" Replacement for Core™ Duo in Centrino® Duo Platforms

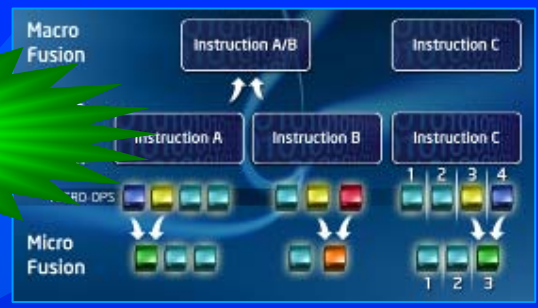
>2X the performance of 2005 Pentium® M (Dothan)

>20% performance gains over Intel® Core™ Duo

No Compromises battery life and form factor neutral

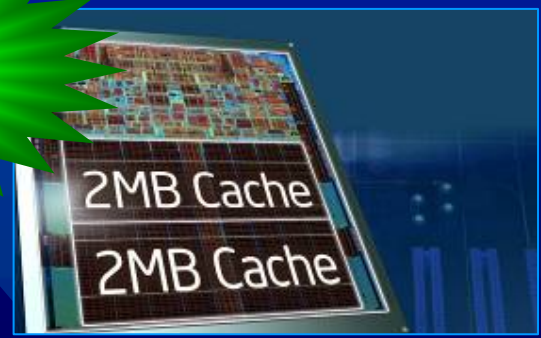


Ops Fusion



64-Bit

4 MB Shared Cache

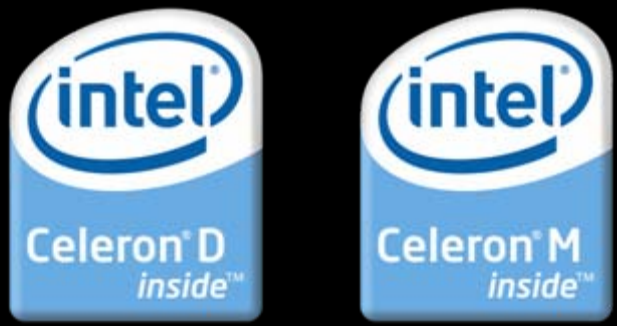


Source: Intel. See back-up for system configurations and other important legal information
Performance comparisons based on pre-production Merom products.

PREMIUM BRAND: PLATFORMS

MAINSTREAM PROCESSOR

VALUE PROCESSOR



New Professional Business Platform

1. **Built-in Management**
2. Proactive Security
3. Energy Efficient Performance

intel

Key Differentiators

Intel® Active Management Technology

Remotely repair down systems

Securely update systems

Audit powered-down PCs

Intel® Virtualization Technology

Dedicated partitions for security software

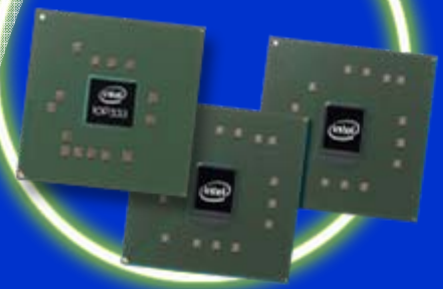
Prevents malicious packets from entering the OS

Supported by Over 45 OEMs, ISVs, & IT Outsourcers

Holistic Server Platform Approach

Dual & Quad Core Processors

Chipsets



intel Xeon® inside™

5000 Sequence

Storage & Networking Interfaces

Advanced Technologies

Intel® I/O Acceleration Technology

Intel® Virtualization Technology

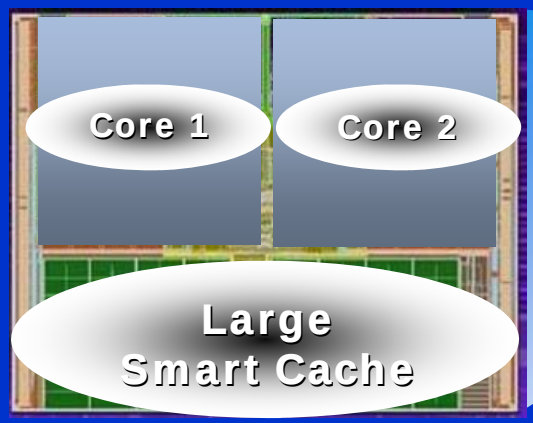
Fully Buffered DIMMs

intel

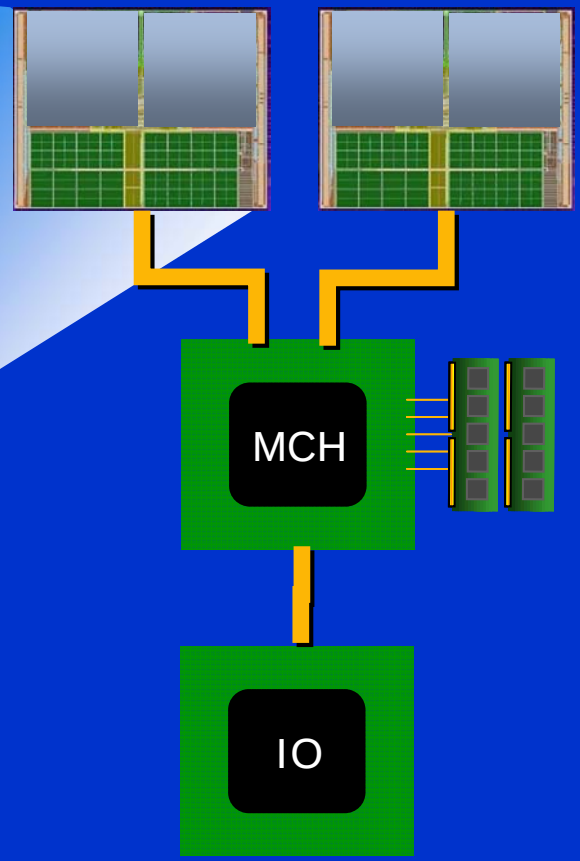
Bensley DP Platform

Balanced System Level Performance

Dual Core Performance



Platform Innovation



Dual Independent High-Speed Buses

Up to 1333

Leading Memory Technology

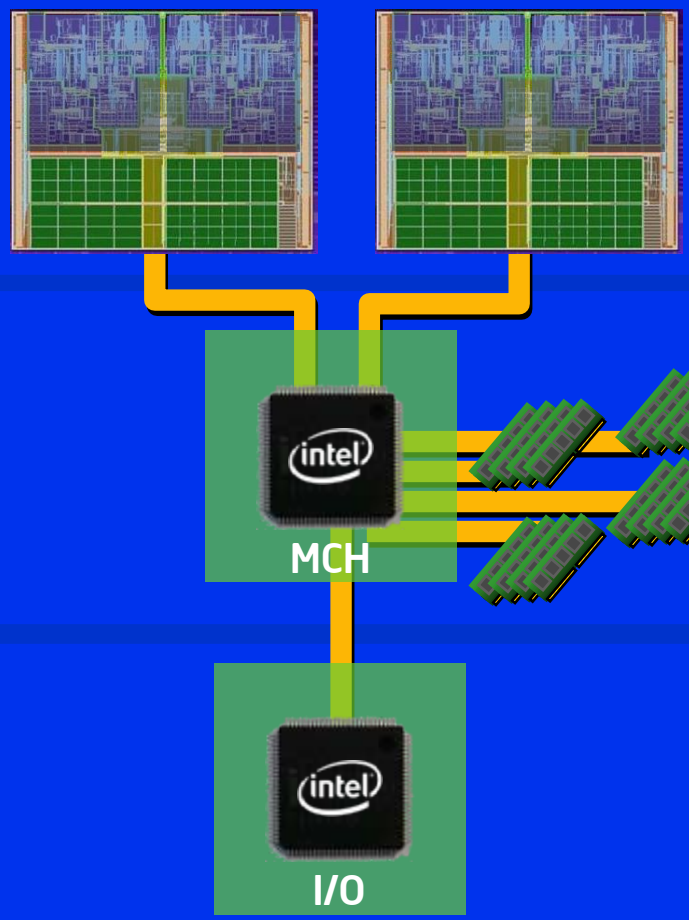
FB-DIMM

High Performance I/O

IOAT

Die photos are not to scale

It's all about Platform Level Performance



Dual Independent High-Speed Buses

Up to 1333

Up To **200%** Faster

Leading Memory Technology

FB-DIMM

Up To **200%** Faster and 4x Capacity

High Performance I/O

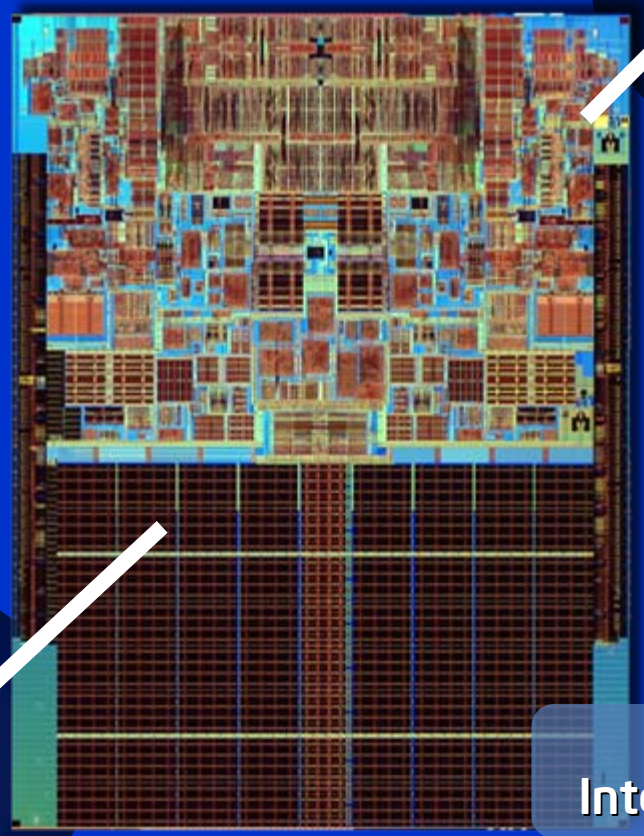
Intel® I/O Acceleration Technology

Greater than **100%** Throughput Improvement

Die photos are not to scale

Intel® Xeon® 5100 Series Processor

Spec-jbb
PERFORMANCE
125%



POWER
40%

...relative to
Intel® Xeon® 2.8GHz 2x2MB

Source: Intel based on SPECjbb_rate_base2000 and thermal design power

Bensley/Xeon 5160 Performance Publications

Server Benchmarks	Xeon over AMD Opt 2.60 DC
TPC-C	1.49x
SAP-SD 2-Tier	1.21x ‡
SPECjbb2005	1.58x ‡
MMB3 (Microsoft Exchange)	1.12x
Lotus Domino 7.0	1.30x
SPECWeb2005	1.09x
SPECint_rate_base2000	1.61x
SPECfp_rate_base2000 (Linux)	1.14x
SPECfp_rate_base2000 (Windows)	1.25x
SPECint_base2000	1.76x
SPECfp_base2000	1.40x
Web Bench	1.20x

HPC Benchmarks	
Linpack	2.31x ‡‡
Fluent	1.27x ‡‡
LS-Dyna	1.27x ‡‡
Star-CD (A-Class)	0.93x ‡‡

Workstation Benchmarks	Xeon over AMD Opt 2xx
SPECapc* for SolidWorks* - MCAD overall	1.16x
SPECviewperf* 8.1 - OpenGL fps	1.19x
SPECapc* for 3ds Max* 7 - DCC Interactive	1.21x
SPECapc* 3ds max* 7 DCC Rendering	1.71x
SPECint_rate_base2000	1.68x
SPECfp_rate_base2000	1.08x
SPECapc* for Pro-E WF2* - MCAD overall	1.02x
SPECapc* for UGS NX3* - MCAD overall	0.80x

Application Performance	Xeon vs Opt 2.6
BlackScholes	1.13x
SunGard ACR	1.25x
WMLS - Windows Media Load Simulator	1.12x

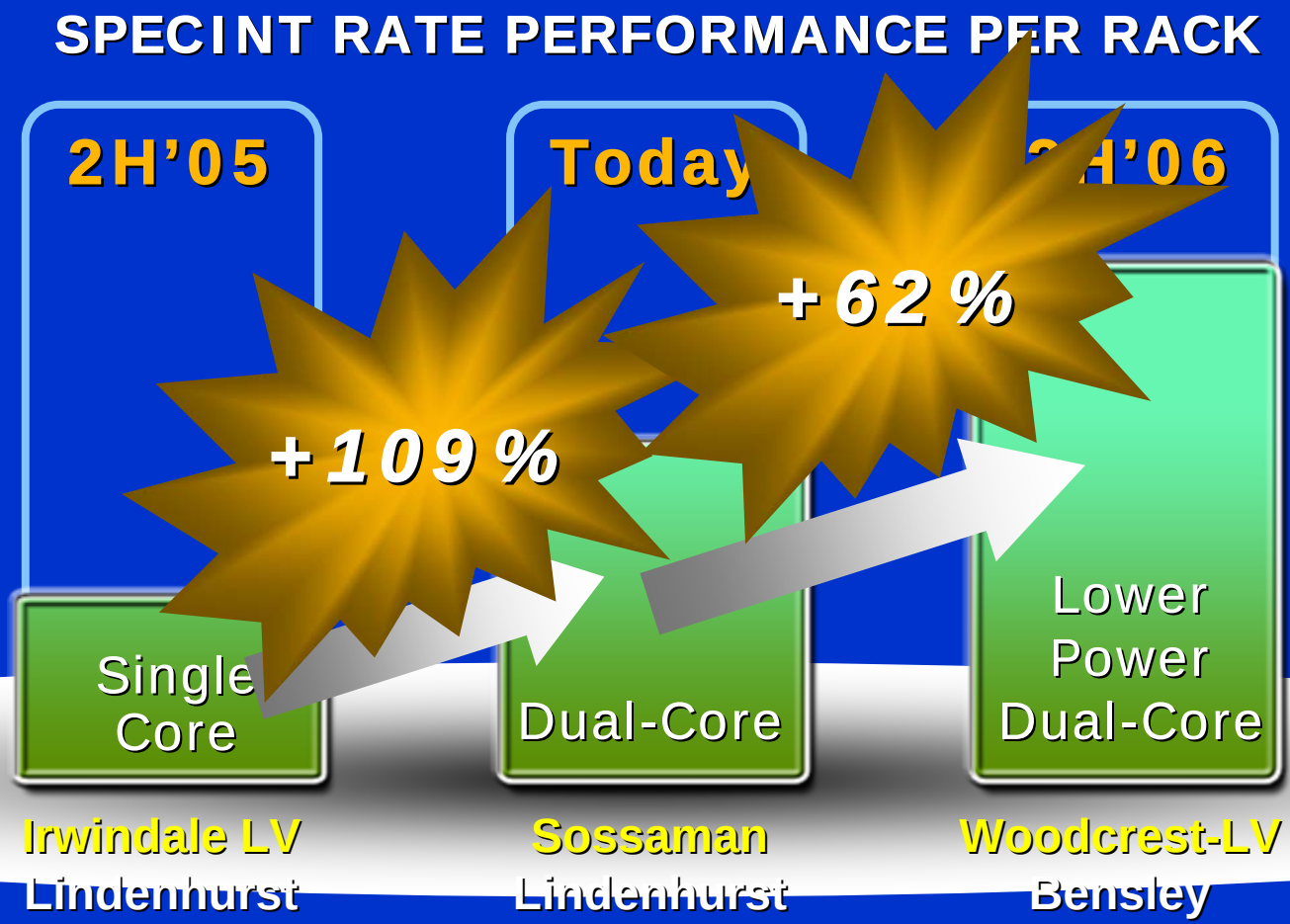
Performance Per Watt	Xeon vs Opt 2.6
SPECint_rate_base2000	1.84x
WebBench	1.47x
SunGard ACR	1.43x
BlackScholes	1.38x
WMLS	1.33x

Bensley delivers Performance and Perf/Watt Leadership

Xeon 5080 – Dual-Core Intel® Xeon® Processor 5080; (“Dempsey 3.73 GHz”);
Xeon 5160 – Dual-Core Intel® Xeon® Processor 5160; (“Woodcrest 3.00 GHz”);
Opteron 2.60 DC – Dual-Core AMD Opteron™ Model 285 (2.60 GHz);

‡‡ AMD Opteron 2.2GHz DC
‡ AMD Opteron 2.4GHz DC

Server Performance / Watt Leadership

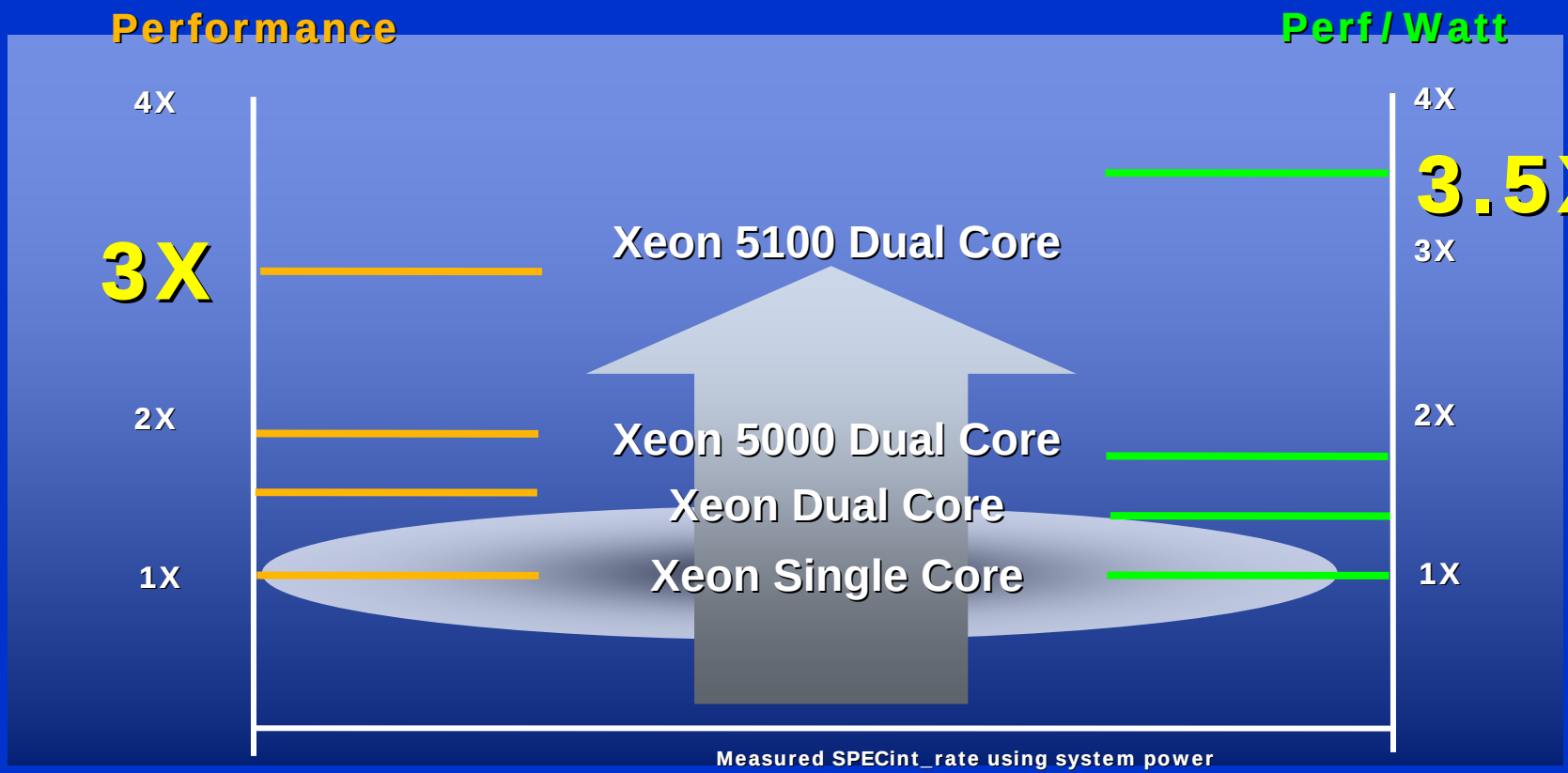


Woodcrest-LV performance based on estimated SPECint*_rate_base2000

Source: Intel Corporation Projections and technical specifications are based on internal analysis and subject to change

All dates and products specified are for planning purposes only and are subject to change.

Breakthrough Performance and Performance / Watt



Truland MP Server Platform

Intel® Virtualization Technology

Leadership RAS

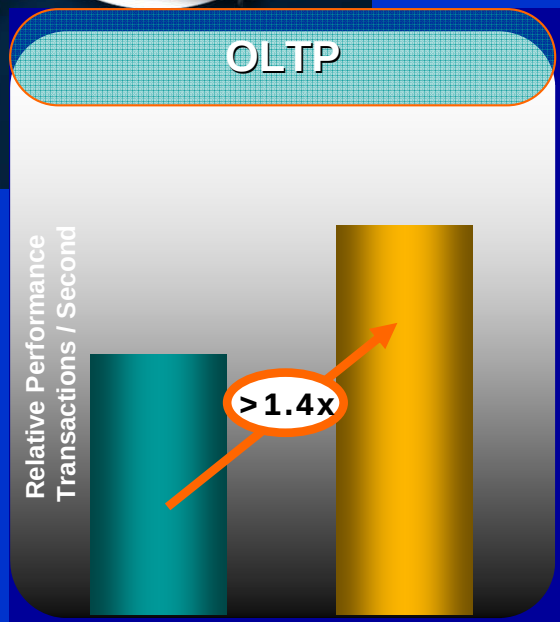
2H'06

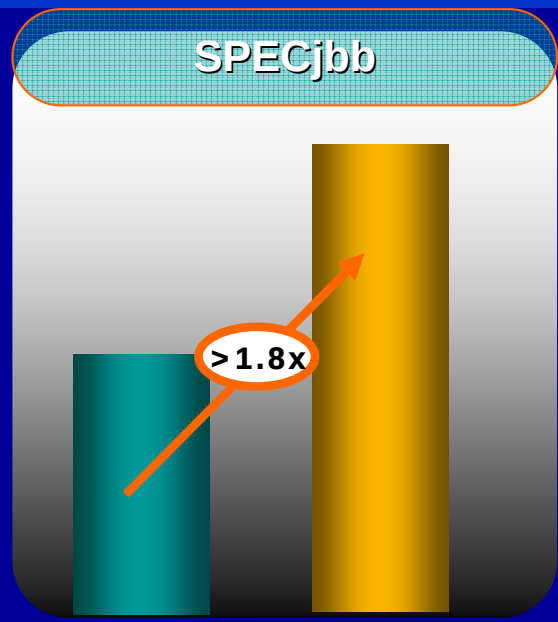
Tulsa Processor

16MB Shared On-die Cache

Cache Reliability Advancements

Tulsa Performance





System Configurations: Tulsa platform: Tulsa A1 3.33 GHz w/ 16M L3/ Twincastle chipset/ 667 MHz FSB. Paxville MP platform: Paxville 3.00 GHz w/ 2x2M L2 /Twincastle chipset/ 800 MHz FSB

2006 Strategy

- Drive 65nm dual-core CPU ramp as fast as possible
- Shift chipsets to 300mm, 90nm factories
- Launch and Ramp Intel® Core™ microarchitecture products in all segments
- Ramp platforms for Digital Home, Mobility and Digital Enterprise
  - Viiv™, Centrino® Duo, and vPro™

Config Details – Broad Claims

Common Disclaimer

- **Performance tests and ratings are measured using specific computer systems and/or components and reflect the approximate performance of Intel products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing. For more information on performance tests and on the performance of Intel products, visit http://www.intel.com/performance/resources/limits.htm or call (U.S.) 1-800-628-8686 or 1-916-356-3104.**
- **All dates and products specified are for planning purposes only and are subject to change without notice**

Woodcrest vs Paxville DP Performance: Based on SPECjbb2005 published results

- Dual-Core Intel Xeon Processor 2.80 GHz based platform details: **Fujitsu Siemens Computers PRIMERGY RX300 S2 server platform: Two Dual-Core Intel® Xeon® processors 2.80 GHz with 2x2MB L2 cache 800 MHz system bus, 4 GB DDR2, Microsoft Windows Server* 2003. Java HotSpot(TM) Server VM (build 1.5.0_06-b05). Referenced as published at 41986 bops and 41986 bops/jvm For more information see** http://www.spec.org/jbb2005/results/res2005q4/jbb2005-20051206-00040.html
- Dual-Core Intel Xeon Processor 5080 based platform details: **Dell PowerEdge 2950 server platform with two Intel® Xeon® processor 5080, 3.73 GHz with 2x2M L2 Cache, 1066 MHz system bus, 8 GB FBDimm memory, Microsoft Windows Server* 2003. BEA JRockit(R) 5.0 P26.0.0. Referenced as published at 64,288 bops and 64288 bops/jvm. For more information see** http://www.spec.org/jbb2005/results/res2006q2/jbb2005-20060411-00100.html

Woodcrest vs Opteron:

- Performance Claim: Based on SPECint_rate_base2000 published results
- Dual-Core Intel Xeon Processor 5160 based platform details: **Dell PowerEdge 2950 Server platform with two Dual-Core Intel Xeon Processor 5160, 3.00 GHz with 4M L2 Cache, 1333 MHz system bus, 8GB (8x1GB) FB-DIMM memory, Microsoft Windows Server* 2003. SPEC binaries built with Intel C/C++ Compiler 9.1. Result submitted to** www.spec.org **for review at 123 as of May 22, 2006.**
- Dual-Core AMD Opteron Processor Model 285 based platform details: **HP Proliant DL145 G2 Server platform with two Dual-Core AMD Opteron™ processor Model 285, 2.60GHz with 1MB L2 Cache, 16GB (8x2GB) PC3200 memory. Microsoft Windows Server 2003 OS, SPEC binaries built with Intel C/C++ Compiler 8.0. Referenced as published at 76.4. For more information see** http://www.spec.org/cpu2000/results/res2006q1/cpu2000-20060306-05697.html
- Performance Per Watt: Based on Results published on SPECint_rate_base2000 with Power measurements by Principled Technologies at http://www.principledtechnologies.com/clients/reports/Intel/WSPECint_rate_0506.pdf as of May 23, 2006
- Dual-Core Intel Xeon Processor 5160 based platform details: **Intel preproduction Server platform with two Dual-Core Intel Xeon Processor 5160, 3.00 GHz with 4M L2 Cache, dual 1333 MHz system bus, 8GB (8x1GB) 667MHz FB-DIMM memory; Microsoft Windows Server x32 Enterprise Edition. SPEC binaries build with Intel compiler 9.0.**
- Dual-Core AMD Opteron Processor Model 285 based platform details: **Server platform with two Dual-Core AMD Opteron™ processor Model 285, 2.60GHz, 8GB PC3200 memory. Microsoft Windows Server x32 Enterprise Edition. SPEC binaries build with Intel compiler 9.0.**

Config Details – Broad Claims

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- **All dates and products specified are for planning purposes only and are subject to change without notice**

Dempsey vs Paxville DP Performance: Based on SPECjbb2005 published results

- Dual-Core Intel Xeon Processor 2.80 GHz based platform details: **Fujitsu Siemens Computers PRIMERGY RX300 S2 server platform: Two Dual-Core Intel® Xeon® processors 2.80 GHz with 2x2MB L2 cache 800 MHz system bus, 4 GB DDR2, Microsoft Windows Server* 2003. Java HotSpot(TM) Server VM (build 1.5.0_06-b05). Referenced as published at 41986 bops and 41986 bops/jvm For more information see** http://www.spec.org/jbb2005/results/res2005q4/jbb2005-20051206-00040.html
- Dual-Core Intel Xeon Processor 5080 based platform details: **Dell PowerEdge 2950 server platform with two Intel® Xeon® processor 5080, 3.73 GHz with 2x2M L2 Cache, 1066 MHz system bus, 8 GB FBDimm memory, Microsoft Windows Server* 2003. BEA JRockit(R) 5.0 P26.0.0. Referenced as published at 64,288 bops and 64288 bops/jvm. For more information see** http://www.spec.org/jbb2005/results/res2006q2/jbb2005-20060411-00100.html

Woodcrest vs Irwindale Perf/Watt: Based on Results published on SPECint_rate_base2000 with Power measurements by Principled Technologies at http://www.principledtechnologies.com/clients/reports/Intel/WSPECint_rate_0506.pdf as of May 23, 2006

- Intel Xeon Processor 3.60 GHz based platform details: **Intel preproduction Server platform with two 64-bit Intel® Xeon™ processors 3.60 GHz with 2MB L2 Cache and 800 MHz system bus and 8GB (8x1024 MB) DDR2-400 memory, Microsoft Windows Server x32 Enterprise Edition. SPEC binaries build with Intel compiler 9.0.**
- Dual-Core Intel Xeon Processor 5160 based platform details: **Intel preproduction Server platform with two Dual-Core Intel Xeon Processor 5160, 3.00 GHz with 4M L2 Cache, dual 1333 MHz system bus, 8GB (8x1GB) 667MHz FB-DIMM memory; Microsoft Windows Server x32 Enterprise Edition. SPEC binaries build with Intel compiler 9.0.**